The heat generated by the union of ammoniacal vapour and chlorine, caused the destruction of the whole apparatus by an instantaneous explosion.

From this time their attempts to form the oil were confined to small phials of the gas, and their trials of its properties were limited to a quantity not greater than a grain of mustard-seed; but still the results were attended with danger. In attempting to collect the gas produced in its explosion, by heating a very small quantity under water in a curved tube, the tube was shattered with great violence, and the author received a wound in the transparent cornea of one eye, from which he has not yet recovered.

Explosions equally violent were afterwards witnessed by Mr. Children and Mr. Warburton, even without confinement: when a small globule of the oil was thrown into a glass of olive oil, oil of turpentine, or naphtha, the glass, though strong, was in each instance shivered to pieces.

When a globule larger than a grain of mustard-seed was touched under water by phosphorus, the explosion was so violent as to break any glass vessel in which the experiment was made. But when smaller quantities were employed, a gas could be collected which, by the experiments hitherto made, contains no oxygen and no inflammable gas.

When thrown into the solutions of phosphorus, in ether, or alcohol, it detonates most violently; but neither ether nor alcohol alone exhibit any violence in their action upon it.

In muriatic acid it gives off gas rapidly, and disappears without explosion. Various experiments were also instituted with other substances, as sulphur and resin, among others, but without any remarkable effects.

From the general tenour of these experiments, the author thinks it probable that the substance here examined is a compound of azote and chlorine, formed by the decomposition of ammonia; while the hydrogen of the ammonia unites with another portion of chlorine, and forms muriatic acid.

The heat and light produced during the expansion of this oil into gaseous matter, is considered by the author to be without a parallel in our present collection of chemical facts; and the suddenness of the explosion more instantaneous than that of any compound hitherto known.

On a remarkable Application of Cotes's *Theorem. By* J. F. W. Herschel, *Esq. Communicated by* W. Herschel, *LL.D. F.R.S.* Read November 12, 1812. [*Phil. Trans.* 1813, *p.* 8.]

This communication includes an application of Cotes's theorem to conic sections in general; but the application noticed in the title relates to the parabola in particular, and it may be thus enunciated.

If any number of radii vectores S P be drawn from the focus to the curve, making equal angles P S P with each other; and if an equal

number of angles P S Q, Q S Q be also taken, each equal to M S P, the angle which the first drawn radius makes with the axis, then will the continued product of all the radii S P be equal to the last S Q multiplied by the latus rectum raised to the power of $n - 1$, n being the number of angles taken.

The author thence proceeds to deduce other theorems that would be for the most part complicated and unintelligible when geometrically enunciated, though sufficiently simple in their algebraic expressions. They are indeed, as the author observes, properties rather of the equations of the conic sections, than of the curves themselves; properties of a limited number of disjoined points, determined according to a certain law, rather than of a series of consecutive points composing a line.

In the course of this investigation the author employs one species of notation, which is new, and for which he apologizes, by explaining its advantage in point of simplicity.

Observation of the Summer Solstice, 1812, *at the Royal Observatory. By* John Pond, *Esq. Astronomer Royal, F.R.S.* Read November 12, 1812. [*Phil. Trans.* 1813, *p.* 27.]

Since a minute description of the new circular instrument, which has been lately put up at Greenwich, is intended to be given to the Society as soon as it is completed in every respect, the Astronomer Royal takes no further notice of its construction than is necessary to show by what means the results of his observations of the sun at the last solstice was obtained.

In other instruments, which take their point of departure from a plumb-line or level, the zenith distance of the sun is the primary object of investigation; and the polar distance of the sun, which is the ultimate object, is obtained by adding the co-latitude of the place, which completes the entire arc.

But by the mural circle at Greenwich, to which there is neither level nor plumb-line, the total arc may be measured without any exact knowledge of the zenith point; and the co-latitude, which in all other cases it is so essential to know correctly, becomes an object of mere curiosity, rather than of real necessity.

It is, however, convenient to assume some imaginary point near the zenith, the position of which, with respect to the fixed stars, may be determined within one tenth of a second; and from this imaginary point Mr. Pond measures the distances of the sun southward, and of the pole northward, as the best means of obtaining the entire arc; but he also adds a computation of the same solstitial place of the sun, as obtained by direct measurement from the pole without the aid of his imaginary intermediate point, and the difference is found to be only 0·15 of a second.

In the determination of this arc, it is evident that, however accurately it may have been mechanically determined, it must still be